

## **A BROWNFIELDS REDEVELOPMENT OPPORTUNITY AT AN ABANDONED MINE LANDS SITE**

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### **ABSTRACT**

In 1999 the Town of Silver City, New Mexico purchased a 500-acre historic mining area known as Boston Hill located immediately southwest of the Town. It was the Town's first open space acquisition. In 2000, the Town received an EPA Brownfields Demonstration Pilot Grant with an extra \$50,000 to assess and plan for development of Boston Hill as a greenspace.

The Town has also been approved for a grant to develop a trail system on Boston Hill from the New Mexico Recreation Trails Advisory Board and would like to emphasize the mining heritage represented by the landscape. Even though the New Mexico Abandoned Mine Lands Bureau (AMLB) had treated the site in the late 1980's, their work was incomplete and several shafts remain on the property. Efforts to get the AMLB to return to Boston Hill have so far been unsuccessful.

The Town has developed a partnership with the Bureau of Land Management to pursue mitigation of remaining mine shafts on adjacent public land with the hope that there will be a spill over effect onto Town owned land. The Town is under severe budget constraints due to the recent layoffs associated with the closing of the Phelps Dodge Chino Mine and does not have funding to address the mitigation of the shafts remaining after the last AMLB project.

The Town plans to use a portion of the trail system grant to install educational signage to alert visitors to potential hazards along with low impact and unobtrusive barriers to delineate areas where extra caution is advised. Visitors to the site, therefore, would be educated about remaining abandoned mine hazards as they entered the site at trailheads as well as with site-specific or hazard-specific interior signage.

The Boston Hill mining area is adjacent to a community of 12,000 that is struggling to grow beyond the typical boom-bust economy built around mining. Emphasis of the areas mining heritage is seen as an opportunity to attract tourists while preservation of open space and development of a trail system improves the overall quality of life in the community.

## INTRODUCTION

Boston Hill is an abandoned mine lands property purchased by the Town of Silver City, New Mexico in 1999 as an open space preserve. It was the Town's first open space acquisition and is located adjacent to, and accessible from, the historic downtown area. Prior to the purchase, a contractor for the New Mexico Environment Department performed a Phase I and a partial Phase II environmental site assessment under the state's Targeted Brownfield Assessment program. Isolated occurrences of certain heavy metals were noted but concentrations were not sufficient to pose a threat to human health from exposure resulting from recreation use<sup>1</sup>.

In 2000, the Environmental Protection Agency awarded the Town a \$200,000 Brownfields Demonstration Pilot Grant and an additional \$50,000 grant to evaluate green space opportunities at the Town's brownfield properties, including Boston Hill. In 2002, the Town Council approved a *Trails and Open Spaces Plan* to guide in the implementation and creation of a trails and open spaces network for the Town<sup>2</sup>. Boston Hill was identified as the Plan's #1 priority. Also in 2002, the Town was awarded a \$38,500 grant from the New Mexico Energy, Minerals and Natural Resource Department (EMNRD), with concurrence from the Federal Highway Administration (FHWA), to develop a trail system on the Boston Hill Open Space Preserve.

The Town of Silver City has developed a partnership with the Las Cruces office of the BLM to develop a mitigation plan for shafts and other abandoned mine land features on BLM land with the hope that there will be a spillover effect to address similar features located on Town land. The Town is also exploring a partnership, in conjunction with the BLM, with WERC, a consortium for environmental education and technology development that includes New Mexico State University, the University of New Mexico, New Mexico Tech and the Sandia and Los Alamos Laboratories.

It is the Town's intent, through its Brownfields Demonstration Pilot, to preserve a portion of the Town's mining heritage and re-develop the abandoned mine area of Boston Hill in such a way as to provide a national model for other areas with similar opportunities. How does Silver City's emphasis on public recreation and heritage conservation at an abandoned mining area jive with mottos such as "Stay Out and Stay Alive"? Are the public safety concerns at abandoned mine lands sites so great that these lands should forever remain "abandoned and underutilized", or worse, have their heritage value destroyed or diminished in the process of making them "safe". Are there creative ways to overcome these redevelopment barriers?

## GEOGRAPHY, GEOLOGY AND HISTORY

The approximately 550-acre area known as Boston Hill is located at the southern extremity of the Silver City Range, a portion of which forms the Continental Divide. Elevations on Boston Hill range from 6000 to 6380 feet. The climate is considered mild with summer temperatures rarely exceeding 100 degrees F. and with winter producing only occasional light snowfalls. Most precipitation occurs during the months of July, August and September with total precipitation averaging about 18 inches per year. Plant and animal life is typical of pinyon-juniper habitat. Copper mining, government, tourism and education are the mainstays of the local economy.

Geologic formations on Boston Hill range from Pre-Cambrian to Quaternary with a nearly complete section of Paleozoic formations making up the majority of the surface exposures<sup>3</sup>. All the sedimentary rocks older than Quaternary have been cut by sills and dikes believed to be of Laramide age. The dikes occupy pre-existing faults. A quartz monzonite porphyry known as the Silver City intrusion forms the eastern boundary of the area. The site resides structurally in a northwest-trending transition zone between the Colorado Plateau on the north and the Basin and Range province to the south. An on-site well has a static water level of 51 feet with the regional groundwater flow to the southeast<sup>4</sup>.

Silver ores, smelted in adobe furnaces, were the focus of early mining beginning in 1870. The area we know as Boston Hill actually consists of three hills. The north face of the smaller hill, known in the early days as Legal Tender Hill (or ledge), is where the Massachusetts and New Mexico Mining Company (also known as the Boston Company) conducted mining operations in 1879<sup>5</sup>. Adjacent mining claims were owned by the Plymouth Rock Company, a separate company but with the same board of directors. A mill was built on Yankie Creek at the base of the hill. By 1883, the Company was in financial trouble and the mine changed hands shortly after, but not before adding a eastern name to this western town.

The completion of the Silver City, Deming and Pacific railroad in 1883 allowed for the transportation of heavy machinery and construction of two smelters. These operated until 1907 and by 1914 the mining of silver ore ceased in the area. The mining of manganiferous iron ore on Boston Hill commenced in 1916 with the ore shipped to Pueblo, Colorado for smelting. World War II saw a peak in manganiferous iron ore production of 86,000 long tons grading out at 13% manganese and 37% iron<sup>6</sup>. Production after World War II was sporadic and ended in the late 1970's, a factor in the withdrawal of rail service to Silver City at the same time.

Because the Town of Silver City is so close to Boston Hill, separate residential communities of miners did not develop. Cultural resources on Boston Hill, besides the unique mine altered landscape itself, include a powder magazine, a blasting cap magazine, numerous trash scatters, erosion control structures and remnants of the alignment of the Silver City, Pinos Altos and Mogollon railroad that operated between July 1906 and June 1908. The archeological survey performed by the Town also identified 13 vertical shafts, 55 open cuts, 383 prospects and 123 waste rock concentrations<sup>7</sup>.

## **ABANDONED MINE LANDS RECLAMATION**

A 1986 environmental assessment by the New Mexico Abandoned Mine Lands Bureau (NMAMLB) of the Mining and Minerals Division (MMD) of the Energy, Minerals and Natural Resources Department (EMNRD), identified 150 sites on Boston Hill as high priority<sup>8</sup>. These included deep shafts, air and light holes over room and pillar mined areas with an average drop to floor of 40 feet (on adjacent private, county and BLM property) and thin overburden over the Globe (county) and Silver Spot (BLM and private) workings. The preferred alternative called for filling 19 shafts, 38 stope holes and one adit. Blasting down thin overburden over portions of the Globe and Silver Spot workings and adding fill to cover the resulting high walls, and filling stoped holes in the Legal Tender (BLM and private) mine roof was also planned. The intent was that no trespassers or landowners would be in danger

of falling through the roof of a mine working or down a shaft. No work was proposed at the several pits with high walls.

After the environmental assessment document was made available to the public, the author and a biology professor at Western New Mexico University (WNMU) questioned the NMAMLB about its plan for the Legal Tender Mine knowing that this mine was a critical local bat habitat. This led to a biological reassessment and a modification in the plan for the Legal Tender even though the U.S. Fish & Wildlife Service had given clearance for the project<sup>9</sup>. The area would be fenced rather than filled to protect the bat habitat with WNMU charged with maintenance of the fencing. The adjacent Globe Mine, owned by the County, was also fenced.

The NMAMLB project that took place in 1989 addressed several of the high hazard areas of Boston Hill but, as discovered during the archeological survey commissioned by the Town in 2000, at least 13 shafts remain un-mitigated. A feature that was considered the highest ranked hazard by one investigator because it was outside any fenced area and adjacent to a major City street was not addressed<sup>10</sup>. All the fences installed during the project have been compromised and WNMU has not provided maintenance.

In 2000, during the development of the grant application for the Brownfields Assessment Demonstration Pilot Grant, a letter of support was solicited from Kerrie Neet, the Mine Regulatory Bureau Chief of the MMD. In her letter of support, she stated that:

“MMD is supportive of the utilization of this abandoned mine area as public open space as an alternative post reclamation mine land use. The Abandoned Mine Land Program of MMD has expended in excess of \$400,000 safeguarding mine features in the area (including an adjacent area known as Chloride Flats) which were hazards to public health and safety. Although MMD is supportive of the development of this area for public use, further participation under the Abandoned Mine Lands program is likely limited in scope and dependent upon project qualification and funding availability<sup>11</sup>.”

## **THE BROWNFIELDS ECONOMIC REDEVELOPMENT INITIATIVE**

Brownfields are industrial and commercial sites that are abandoned or underutilized because of real or perceived contamination. Redevelopment and reuse of these sites can bring important benefits to communities, particularly those such as Silver City that is experiencing a depressed economy. The recent closure of the Phelps Dodge Chino Mine has left county and municipal government struggling to make ends meet. The selection of the Town of Silver City by the Environmental Protection Agency (EPA) to receive a Brownfields Demonstration Pilot grant has paved the way for the Town to look at economic development opportunities associated with brownfield properties.

The program strategy for the Town of Silver City's brownfields program is “to take advantage of the Town's unique qualities and develop its underutilized and degraded resources to improve the quality of life in our small town and revitalize our community”. Community revitalization, and the **“removal of tarnish from Our Silver”**, is seen as the key to attracting new business to our community<sup>12</sup>.

The Town's purchase of Boston Hill was made possible by a bequest from a former resident, Lenny Merle Forward. As the newly hired brownfields coordinator, my first job was to apply for a grant to develop a trail system on Boston Hill. The application was

successful and the Town recently signed a Joint Powers Agreement with the EMNRD, administrator of the National Recreation Trails Act in New Mexico. The project calls for the development of three trailheads, including one in historic downtown Silver City, and a ten-mile trail system. The first trail building work party on Boston Hill took place on the first weekend in August 2002, in partnership with the local Silver Spokes bicycle club and the International Mountain Biking Association.

Even prior to the development of this trail system, Boston Hill is used today by many citizens for hiking, bicycling, jogging, and walking their dogs as well as solitude from town life and appreciation of the vast vistas that can be seen from elevated areas. Western New Mexico University has utilized Boston Hill for geology and biology studies while the local Native Plant Society periodically sponsors hikes in the area to explore its unique fauna that grows so well on the highly mineralized soil.

The Town Council has consistently shown support for the Boston Hill project beyond the initial purchase and the approval of the Trails and Open Spaces plan. In June of this year, the Council unanimously approved the purchase of an additional 14.5 acres that was critical to the protection of the Boston Hill Open Space preserve with remaining money in the Forward fund.

There is a national trend by state and federal agencies to reduce public danger and potential liability at abandoned mine land sites by discouraging public access, often by destroying the mine features<sup>13</sup>. Creative strategies are needed to buck this trend and several communities across the West like Silver City are exploring the benefit of emphasizing their mining heritage to attract tourists. The recently signed brownfields legislation that will fund the national program in FY 2003 and beyond carries a new emphasis on “mine scarred lands” as brownfields and will present more opportunities for communities across the nation to consider the heritage value of these lands when considering redevelopment and reuse plans.

## **ADDRESSING PUBLIC SAFETY CONCERNS AT BOSTON HILL**

Shafts, subsidence, and high walls are all elements of concern that have been associated with Boston Hill. What is the Town’s approach to these issues and the Town’s plan to address these?

Shafts are the major concern because their openings are small and not easily seen and may have incompetent material around the opening. Some contain water. These areas have been signed and may be fenced pending development of the mitigation plan.

Subsidence has been considered a potential problem at Boston Hill by the NMAMLB in areas with thin roofs over underground workings. To my knowledge there has never been a subsidence event on Boston Hill including during the mitigation of air and light openings when heavy equipment was used to haul material to fill the openings during work in 1989. We have, however, seen runoff water on adjacent county land work its way through the soil cover over these openings that were filled, creating new “fissures”. Without evidence to the contrary, subsidence is not considered a major concern on Town land at Boston Hill by people using the area for non-motorized recreation. The BLM plans to bring in a mining engineer associated with WERC to assess the stability of the roof of the Legal Tender underground workings as part of their mitigation work.

High walls most closely resemble natural features found throughout our public lands. In places there is incompetent material along the edge that is being worked on by gravity and

freeze-thaw cycles that could give way unexpectedly. The same is true in the natural environment. While the steep drop offs associated with high walls could easily kill or seriously injure someone who falls off the edge, this alone is not reason to deny public access. We have several national parks that highlight canyons. One of the most amazing hiking experiences I have had has been on the Angels Landing trail in Zion National Park. Those of you familiar with this trail know there is a point where the trail, with a width of about four or five feet, passes between two steep canyon faces with a sheer thousand feet or more drop off **on each side**. It is one of the most popular hikes in Zion<sup>14</sup>.

The Towns first step after completion of the archeological survey and locating the shafts was to contact the NMMLB to see what assistance they would be able to provide. A face-to-face meeting in Santa Fe on March 21, 2001 was promising; it appeared there was some money available to address the remaining high priority concerns and since they had another project in nearby Lordsburg, we were hopeful that assistance would be forthcoming. Silver City, due to its distance from Santa Fe, is used to being somewhat isolated from state government interaction and opportunities compared to communities closer to Santa Fe. There is a lot of expertise and professionalism in the State's AMLB, however, that we were eager to engage.

As of this writing, sixteen months have gone by and we are still waiting and wondering if our AMLB will ever return to Silver City and continue with the work left uncompleted after their 1989 project. Ironically, an open space project with a proposed trail system in the Cerrillos Hills near Santa Fe is receiving NMMLB assistance to mitigate eighty-six shafts in the area. Included in the mitigation design are plans to install grates across some of the mineshafts so the public can walk over them and see what they look like<sup>15</sup>.

Fortunately for the Town, one of our neighbors on Boston Hill is the Bureau of Land Management. When they were contacted about the abandoned mine lands situation on public land on Boston Hill, they showed up to assess the situation. They also provided the Town with carsonite posts and mine hazard warning stickers that have since been installed at all unmitigated shafts and other areas of concern. The BLM often partners with the NMMLB on projects across the state but as of this writing they have been unable to get a commitment of assistance with the Boston Hill project.

In FY 2003, the BLM anticipates receiving funding to address the shafts located on BLM land that is considered an extension of the Boston Hill Open Space. We are hopeful that there will be a way to also address the shafts on Town land with the same funding through a cooperative arrangement.

The Town perceives that one of the keys to public use and enjoyment of the Boston Hill Open Space is education of the recreating public. Access to Boston Hill will occur primarily at the three proposed trailheads. Appropriate signage at the trailheads, and at site-specific areas on the property, is an opportunity to educate the public about where caution needs to be exercised while they enjoy Boston Hill. In this way, the Boston Hill brownfield is transformed from an abandoned and underutilized property not contributing to the vitality of the Town, to a unique and easily accessible greenspace that preserves the Town's mining heritage while enhancing its quality of life.

## REFERENCES

1. Duke Engineering & Services, January 2000, Phase I and Limited Phase II Environmental Site Assessment for the Boston Hill Site, Silver City, New Mexico.
2. Trails and Open Spaces Plan, adopted by the Silver City Town Council on February 26, 2002; developed by Trails and Open Spaces Committee and Town Planning Department with assistance from the Rivers and Trails Conservation Assistance Program of the National Park Service.
3. Entwistle, Lawson W. (1944). Manganiferous Iron-Ore Deposits Near Silver City, New Mexico. New Mexico Bureau of Mines and Mineral Resources Bulletin No. 19.
4. Trauger, F.D. (1972). Water Resources and General Geology of Grant County, New Mexico. New Mexico Bureau of Mines and Mineral Resources, Hydrologic Report 2.
5. "The Massachusetts and New Mexico Mining Company", Grant County Herald, May 24, 1879.
6. Entwistle, Lawson W. (1944).
7. Neal Ackerly, Ph.D. (2001). An Archaeological Survey of the Boston Hill Mining District, Town of Silver City, Grant County, New Mexico. Report prepared by Dos Rios Consultants.
8. Environmental Assessment for the Silver City AML Project (1986).
9. Salter, Robert (1988). Supplemental Information to the Environmental Assessment for the Silver City AML Project
10. Goodson & Associates, Inc., Consulting Engineers (1983). Task Report, 70-73.
11. Neet, Kerrie E., Letter to Region 6 Brownfield Coordinator dated January 27, 2000.
12. Gendron, Joseph L. (2001). Application for "Supplemental Assistance for Brownfield Assessment Demonstration Projects".
13. Milford, Homer E. (1998). The Threats to Our Mining Heritage. CRM, Vol. 27, No.7: 61-64. USDI National Park Service.
14. Zion Canyon, Utah. OneDayHikes.com..  
<<http://www.onedayhikes.com/HikesID=11>>
15. Neary, Ben. Mine Shaft Safety. The New Mexican. April 5, 2002.  
<<http://www.sfnewmexican.com/site/news.cfm?newsid=3759117&BRD=2144&PA G=461&dep>>